REMARKS

The present amendment addresses the Examiner's objections, included in the Examiner's action of May 16, 2003.
New claim 41 has been drafted from the claim 21 (original claim 12), further adapted to distinguish from Marchok and Frodigh.

In the system of claim 41, frequency deviations in the uplink are corrected for at the subscriber transmitter. Such frequency deviations would otherwise cause a deterioration in the orthogonality between signals in the uplink. Signals from all the subscribers arrive at the base at the required frequency and can be processed together, with no degradation in performance.

It is not seen that this combination of features is disclosed or rendered obvious in the reference cited by the Examiner.

Frodigh et al., U.S. Patent 5,726,978, refers to "orthogonal" only to mean the OFDM (orthogonal frequency division multiplexed system) system, not as a deliberate effort to correct for deteriorations in orthogonality, due to frequency deviations.
"Orthogonality" is not mentioned in Frodigh with reference to signals in the uplink, nor with reference to Figs. 2 or 3 there, nor regarding transmitting means 300 with receiving means 330 there.

Frodigh does not address the problem of orthogonality in the uplink; no means are included to correct for frequency deviations therein.
Means 300 in Frodigh is not channeling means, but the "link transmitter 300" there, col. 7 line 66.

Marchok et al., U.S. Patent 5,999,483, discloses an apparatus for upstream clock synchronization. In Marchok the receiver at base tracks frequency deviations, for each subscriber separately, whereas in the present invention each subscriber corrects its transmission so that the signals from each subscriber arrives at base at the required frequency - a completely different system and method, having different properties. Fig. 3 in Marchok details the downstream channel, whereas my invention refers to the upstream. Fig. 7 there details the upstream, col. 12 lines 46-67. Frequency deviations in transmitter 277 there or in multiplexers there are not corrected; rather, receiver VCXO 290 at the base is adapted to the actual received frequency, tracking deviations using a DPLL.

Since each subscriber may have a different frequency deviation, the above system is apparently good for receiving from only one subscriber; there may be such a receiver 287 at the base, for each subscriber transmitter 277; frequency multiplexing with a different pair of frequencies Fmux/Fdemux may be used. Thus, the system in Marchok is complex and expensive, if there are many subscribers in the system. The novel system in the present disclosure uses a common receiver at base.

As channels deviate in frequency, there may be overlap, wherein part of the signals from one user step on signals from another and become mixed; at the base they are received together and the damage cannot be repaired anymore.

Thus it appears that the benefits achieved with the system in new claim 41 could not have been predicted from Frodigh or Marchok, and thus the structure of the device in the present device appears to be nonobvious. There is no suggestion to combine these patents, and even such a combination would not disclose the present invention.

Therefore, it appears that new Claim 41 defines a novel combination of structure to achieve a cover device, which is not disclosed in Frodigh and/or Marchok.
It is submitted, therefore, that new Claim 41 is clearly allowable over the cited references.

Claims 42-50 all depend from claim 41, and are therefore believed allowable with that claim apart from the further features set forth, which features are also lacking in the cited references.

New claim 42 adds the limitation of improving a system operating according to the DVB-T standard, which is widely used and unidirectional. Gudmundson et al., U.S. Patent 5,790,516, does not mention DVB-T anywhere in that patent. "Broadcasting" is mentioned only in "Other publications", and "broadcast" is only mentioned in "History of the Prior Art" there, not as part of their invention.

The system in Gudmundson is not bi-directional, but only from a transmitter to a receiver.
My invention converts a DVB-T system to bidirectional, preserving full compatibility with that system - see for example page 7 first paragraph.

The system in Gudmundson does not include a plurality of subscribers, but only one receiver. Thus, Gudmundson appears to have a different structure and method of operation, construed to a different purpose and providing a different benefit, than the present invention.
There appears to be no motivation to combine it with Frodigh and Marchok.

New claim 43 refers to signals from base including a guard time interval, wherein signals are transmitted from subscriber units, synchronous with the guard time interval.

In Davies et al., U.S. Patent 5,953,311, there is no transmission at all back to the base station. The timing synchronization circuit in Davies is only for use in receiving signals from the base in the demodulator there, for locating a boundary of the guard interval.

The present invention, however, has a different purpose: to exploit the guard interval for converting a uni-directional system to a bi-directional system. This is a different system and method, and a different benefit. Davies only refers to improvements in a receiver (col. 1 line 7; col. 3 line 5; col. 4 line 12; col. 6 line 17), whilst it remains just a receiver - no mention of a bi-directional system in Davies.

There is no motivation to combine Davies with Frodigh/Marchok, and even such a combination would not reveal a system transmitting back to base, synchronous with the guard interval.

New claim 44 further includes means for transmitting Automatic Synchronization Control (ASC) signals to each subscriber, for correcting deviations in a transmit time of each subscriber, so that all the subscribers in an uplink channel will be received at the base during a same time window.
Alamouti et al., U.S. Patent 5,933,421, does not send such control signals. Only pilots are sent, but this would not solve the problem that subscribers close to base will be received earlier, whereas subscribers farther from base will be receive later on.

There is no indication in Kaiser et al., U.S. Patent 6,188,717, of any ASC, or sync, or closed loop. Col. 6 lines 8-10, Fig. 5 there only includes pilots (reference signals) sent from base, but no control signals for the subscriber to change its timing so that all transmissions from all

subscribers arrive at base at the same time, see for example disclosure in my application pages 9, 10, 34. This is important in allowing all signals received from subscribers to be processed together, using FFT for example as detailed.

The pilots in Kaiser cannot bring the received signals at base to be at the same timing - signals from subscriber near to base will appear first, signals from subscriber further away - will appear later.

In new claim 45, each subscriber unit further includes means for correcting the frequency of transmitted signals according to the frequency of the pilot signals from base.

Alamouti et al., U.S. Patent 5,933,421, does not refer at all to the frequency deviations such as from Doppler effect or its correction in the uplink. There is mention of orthogonality in the context of OFDM in general, but absolutely nothing on means for achieving it with mobile subscribers.

There is no indication in Alamouti Fig. 1.6 or col. 16 of a system "wherein each subscriber unit further including means for generating the transmit signal having a frequency responsive to the frequency of the pilot signal" .

Fig. 1.10 and col. 15 lines 5-10 in Alamouti detail the base receiver there and absolutely do not refer to a subscriber, nor is there a mention of generating the transmit frequency at the subscriber responsive to pilots from the base.

Therefore, neither Frodigh, nor Marchok nor Alamouti do not include the inventive aspects of the present disclosure, nor a combination thereof would include it; moreover, there is no suggestion or indication in either of them of such a combination.

New claim 46 further includes means for implementing a dynamic allocation of carriers to subscribers, according to their bandwidth demands.
The means 360 in Frodigh is not for allocating carriers on demand; rather, it is "ACA processing portion 360" ; Adaptive Channel Allocation (ACA) is "a method of allocating channel frequencies among cells in non-OFDM systems" - something different altogether, specifically excluding OFDM, see col. 3 lines 25-30, col. 7 lines 14-16, 39-41.

Frodigh does not disclose "allocating carriers according to their bandwidth demands". Rather, Frodigh uses interference (I) measurements and adaptive channel allocation to preserve a desired signal quality (C/I) in the link. My system, however, allocates subcarriers according to bandwidth demand from users, so each user can get more or less bandwidth, as desired there- a different structure and method of operation, for a different benefit.

New claim 47 further includes means for implementing a dynamic allocation of CDMA codes to subscribers, according to their bandwidth demands.

Frodigh does not mention CDMA at all.
The means 360 in Frodigh is not for allocating resources on demand.

New claim 48 further includes coding and decoding means comprising Fast Fourier transform means. Such a structure can only work in the uplink at satisfactory performance, when correcting for frequency deviations, which is not disclosed nor suggested in Frodigh.

New claim 49 further includes synchronization signals transmitted from the subscriber units with a combination of CDMA modulation codes and OFDM coding/decoding means to achieve orthogonality in the uplink.
Kaiser et al., U.S. Patent 6,188,717, uses CDMA for data encoding.
My system uses CDMA in the uplink not for data encoding, but for synchronization purposes (i.e. page 9) - a different structure and method of operation, for a different benefit.

New claim 50 further includes CDMA modulation codes comprise orthogonal Walsh codes, with several subscribers operating in the same frequency band.

Kaiser transmits different frequencies for different users; my system uses the same frequencies for various users, with different Walsh codes - the codes separate between users, to achieve better spectrum utilization.

New claim 51 has been drafted from the claim 31 (original claim 16), further adapted to distinguish from Marchok and Frodigh.

Claims 52-60 all depend from claim 51, and are therefore believed allowable with that claim apart from the further features set forth.

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Claims 52-60 further include the additional limitations of claims 42-50, respectively, limitations that have been discussed and distinguished above.

In view of the foregoing, it is believed that this application is now in condition for allowance, subject to the approval of the new drawings by the Examiner.

Respectfully submitted,

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